

Remarks

Claims 1-8 are pending herein. Claims 5-8 have been withdrawn as being directed to a non-elected invention. By this Amendment, claims 1 and 3 have been amended to correct minor grammatical errors, and the Abstract has been replaced with a new Abstract to overcome an objection thereto.

In the Office Action, the abstract is objected to; claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over the “admitted state of the prior art” (i.e., pages 1-4 of the instant specification) in view of U.S. Application Publication No. 2003/0154919 to Rice et al. (“Rice”) and Japan 05-278038 (“JP ‘038”); and claims 2-4 are rejected under §103(a) as being unpatentable over the “admitted state of the prior art” in view of Rice and JP ‘038 as applied to claim 1 and further in view of WO 01/54188 (“WO ‘188”), U.S. Patent No. 4,115,507 to Pico et al. (“Pico”) and U.S. Patent No. 5,634,266 to Sherstinsky et al. (“Sherstinsky”). Because WO ‘188 is in Japanese, the Examiner has used the corresponding U.S. national stage application, i.e., U.S. Application Publication No. 2003/0007308 to Harada et al. (“Harada”), as the English-language translation. Column and line references are to Harada.

In view of the amendments and remarks herein, Applicants respectfully request reconsideration and withdrawal of the objection and rejections set forth in the Office Action.

I. Objection to the Abstract

The Abstract is objected to because it is more than 150 words in length. By this Amendment, the Abstract has been replaced with a new Abstract of appropriate length. Accordingly, Applicants respectfully request that the objection be withdrawn.

II. Rejection of Claim 1

Claim 1 is rejected under §103(a) as being unpatentable over the “admitted state of the prior art” in view of Rice and JP ‘038.

According to the Office, the “admitted state of the prior art” (pages 1-4 of the specification) teaches all of the features of claim 1 except for the use of the metal padding plug coated with a metal-resin composite layer and the removal of the padding plugs after coating.

JP ‘038 is cited for teaching that a desirable mold release coating for a material such as steel is provided by electrolessly plating the mold with a nickel containing 5-25 volume percent

of polytetrafluoroethylene (PTFE), producing a coating of a composite of nickel metal and PTFE resin (see Abstract).

Rice is cited for teaching the use of a masking apparatus in a thermal spray process (see Figure 4B and paragraphs [0040]-[0041]). Rice is further cited for disclosing a cup 62 provided as the mask that can be made of thin sheet metal, including aluminum or steel, which can withstand the temperature of droplets from the thermal spray device. Rice is also cited for teaching that the cup can be further supplied with a coating to reduce the adherence of thermal spray droplets, such as TEFLON® or a mold release coating (paragraph [0044]).

According to the Office Action, it would have been obvious to modify the “admitted state of the prior art” to use metal padding plugs that have been coated with a nickel-PTFE release coating to mask the gas holes during coating, as suggested by Rice and JP ‘038, in order to provide a metal padding plug that does not stick to the coating material.

Applicants respectfully submit that claim 1 would not have been obvious over the “admitted state of the prior art” in view of Rice and JP ‘038.

An important feature of the method recited in claim 1 is the use of a padding plug having “a core member made from a metal material and a metal-resin composite layer covering the circumferential surface of the core member” to fill the holes of the internal member prior to the plasma ceramic spraying process. As noted above, the Office Action states that the “admitted state of the prior art” (pages 1-4 of the specification) teaches all of the features of claim 1 except for the use of the metal padding plug coated with a metal-resin composite layer and the removal of the padding plugs after coating.

For the reasons given below, Applicants respectfully submit that it would not have been obvious in view of Rice and/or JP ‘038 to modify the “admitted state of the prior art” to use the metal-resin composite layer recited in claim 1.

At page 3, lines 23-31, the instant specification teaches the following:

[i]f the padding plugs are made of a metal material, they are not molten by heat of plasma spraying. However, it is noted that coating material conjugates to the metal material of the padding plugs disadvantageously. Even if it is desired to extract the padding plugs after the coating process, they could not be extracted with ease since they are welded to the coating film. High-handed extraction would cause the coating film to be peeled or cracked.

In the aforementioned passage, the instant specification teaches that the coating film, which is made of a ceramic material such as Al₂O₃ (see, e.g., page 2, line 8), conjugates to the metal material of the padding plugs disadvantageously. Instant claim 1 recites that the metal-resin composite layer is a complex consisting of a metal material and a resinous material exhibiting nonconjugative property to the ceramic coating film.

JP '038 does not teach applying a ceramic coating film onto the nickel-PTFE release coating disposed on the metallic mold. JP '038 teaches that the nickel-PTFE release coating improves the releasability of a rubber product formed in the mold. Thus, JP '038 only teaches that the nickel-PTFE release coating is non-conjugative relative to rubber, not relative to ceramic material. Therefore, Applicants respectfully submit that JP '038 would not have motivated one skilled in the art to use the nickel-PTFE release coating of JP '038 in a method involving coating such release coating with a ceramic coating, wherein the release coating needs to be non-conjugative relative to such ceramic coating.

Furthermore, Applicants submit that one skilled in the art would not have been motivated by JP '038 to use the nickel-PTFE release coating therein as a hole-masking padding plug in a plasma ceramic spraying process. During a plasma spraying process, sprayed ceramic particles of a high temperature and having a high kinetic energy attack the surface of a hole-masking padding plug. Therefore, a hole-masking padding plug for plasma ceramic spraying should have certain properties, e.g., the plug does not melt under high temperature, the sprayed layer does not bind with the plug strongly, and the plug inserted in a hole does not apply thermal stress to the sprayed layer. However, a molding die for molding rubber does not require such properties. JP '038 only teaches that the release coating therein has demolding properties and wear resistance. Because of the differences in properties required for surfaces of a molding die for rubber and a hole-masking padding plug for plasma ceramic spraying, Applicants submit that this is an additional reason why one skilled in the art would not have been motivated by JP '038 to use the nickel-PTFE release coating therein as the metal-resin composite layer recited in claim 1.

Thus, for at least the foregoing reasons, Applicants respectfully submit that it would not have been obvious to use the nickel-PTFE release coating of JP '038 in the method taught in the "admitted state of the prior art".

Applicants further submit that claim 1 would not have been obvious over the "admitted state of the prior art" in view of Rice.

At the beginning thereof, Rice teaches that the deposition of metal or ceramic coating to a part using a thermal spraying process is well known (paragraph [0002]). However, this is the only mention Rice makes of a ceramic coating. In the discussion of the invention therein, Rice teaches that “[v]arious coating materials may be utilized to form the layer of [coating] material 43, such as electrically conductive materials. Alternatively, composite materials may also be utilized to coat the bores” (see paragraph [0034]). Rice does not mention any ceramic materials. Thus, Applicants submit that Rice does not teach the use of a ceramic coating material in connection with the invention therein. Therefore, Rice does not teach applying a ceramic coating film onto the masking cup or any other surface disclosed therein.

Rice teaches that the cup 62 therein is made from

a resilient, compressible or compliable material such as thin sheet metal including aluminum or steel, a polymer such as silicone or a Santoprene® synthetic elastomer from Monsanto Co., a composite material such as a reinforced polymer or a composite aluminum foil laminated to a fiberglass cloth or another polymer.

Alternatively, any material that returns to its original shape after being deformed or squeezed by fingers 98 and can withstand the temperature of the droplets from thermal spray device 40 is believed suitable for practicing the invention. (paragraph [0040]).

As noted in the Office Action, Rice is also cited for teaching that the cup can be further supplied with a coating to reduce the adherence of thermal spray droplets, such as TEFLON® or a mold release coating (paragraph [0044]). Applicants submit that Rice teaches that the cup therein requires a separate coating disposed thereon in order to provide non-conjugative behavior relative to the thermally-sprayed coating (whether metal or ceramic). However, the separate coating is not a metal-resin composite layer. In other words, Rice does not teach or suggest the use of a metal-resin composite layer to exhibit non-conjugative property relative to a thermally-sprayed metal coating. Therefore, Applicants respectfully submit that Rice would not have motivated one skilled in the art to use a metal-resin composite layer in a method involving coating such metal-resin composite layer with a ceramic coating, wherein the particular metal-resin composite layer needs to be non-conjugative relative to such ceramic coating.

In addition, cup 62 in Rice is not a padding plug inserted into or filling up a hole. Rather, cup 62 is in the form of a tray for receiving thermal spray droplets below the sprayed area. Cup 62 is located near the end portion of the spray target so as to receive the oversprayed droplets.

Properties required of cup 62 are different from those required of a hole-masking padding plug which is plugged into a hole located in the main portion of a spray target. Thus, for at least this additional reason, Applicants submit that one skilled in the art would not have been motivated by Rice to use the material of cup 62 in the "admitted state of the prior art."

Therefore, for at least the aforementioned reasons, Applicants respectfully submit that claim 1 would not have been obvious over the "admitted state of the prior art" in view of Rice.

For all of the reasons discussed above, Applicants submit that claim 1 would not have been obvious over the "admitted state of the prior art" in view of Rice and JP '038.

III. Rejection of Claims 2-4

Claims 2-4 are rejected under §103(a) as being unpatentable over the "admitted state of the prior art" in view of Rice and JP '038 as applied to claim 1 above, and further in view of WO '188, Pico and Sherstinsky. As mentioned above, the Examiner is using Harada as the English translation of WO '188, and column and line references are to Harada.

Applicants respectfully submit that claims 2-4 would not have been obvious over the "admitted state of the prior art" in view of Rice and JP '038 as applied to claim 1 above, and further in view of WO '188, Pico and Sherstinsky.

Claim 2 depends upon claim 1 and, therefore, includes the features recited therein. Claim 3 is an independent claim but recites the use of the coating method of instant claim 1. Claim 4 depends upon claim 3. Thus, claims 2-4 all include the features of claim 1.

For the reasons given above, Applicants submit that claim 1 would not have been obvious over the "admitted state of the prior art" in view of Rice and JP '038. Applicants submit that claims 2-4 are patentable over the "admitted state of the prior art" in view of Rice and JP '038 for the same reasons that claim 1 is patentable over this combination of references. Applicants further submit that WO '188, Pico and Sherstinsky do not cure the failure of the "admitted state of the prior art" in view of Rice and JP '038 to teach the features of claim 1.

Applicants submit that whether or not it is obvious to modify the "admitted state of the prior art" in view of the secondary reference as suggested in the Office Action, the result would still not be the methods set forth in claims 1-4.

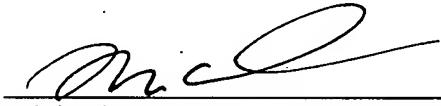
Thus, Applicants respectfully submit that claims 2-4 would not have been obvious over the "admitted state of the prior art" in view of Rice and JP '038 as applied to claim 1 above, and further in view of WO '188, Pico and Sherstinsky.

IV. Conclusion

In view of the amendments and remarks herein, Applicants respectfully request reconsideration and withdrawal of the objection and rejections set forth in the Office Action.

If any additional fees under 37 C. F. R. §§ 1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300, Order No. 033082M177.

Respectfully submitted,
SMITH, GAMBRELL & RUSSELL, LLP

By: 

Michael A. Makuch, Reg. No. 32,263
1850 M Street, N.W., Suite 800
Washington, D.C. 20036
Telephone: (202) 263-4300
Facsimile: (202) 263-4329

Dated: April 11, 2007

MAM/MM/cj

Enclosures: (1) Petition for Extension of Time (Two Months)
(2) Check for the sum of \$450